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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* OLE SIBBESEN and JENS FRISBAEK SORENSEN

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Appeal 2010-008877  
Application 10/626,583  
Technology Center 1600

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Before LORA M. GREEN, FRANCISCO C. PRATS, and  
JEFFREY N. FREDMAN, *Administrative Patent Judges*.

PRATS, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

This appeal under 35 U.S.C. § 134 involves claims to a bakery product or dough for a bakery product. The Examiner rejected the claims as obvious.

We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

STATEMENT OF THE CASE

Claims 56-67, 69, and 70 are pending and on appeal (App. Br. 4).<sup>2</sup>

Claims 56-59 illustrate the appealed subject matter and read as follows:

56. A bakery product or a dough for making a bakery product comprising a polypeptide expressed from the nucleotide sequence of SEQ ID NO:6, wherein said bakery product or dough for making a bakery product is suitable for use in a foodstuff.

57. The bakery product or dough for making a bakery product of claim 56, wherein said polypeptide does not contain a leader sequence.

58. The bakery product or dough for making a bakery product of claim 56, wherein said polypeptide has the amino acid sequence of SEQ ID NO:5.

59. The bakery product or dough for making a bakery product of claim 57, wherein said polypeptide has the amino acid sequence of amino acids 29-213 of SEQ ID NO:5.

The following rejections are before us for review:

(1) Claims 56-66, 69, and 70, rejected under 35 U.S.C. § 103(a) as obvious over Haarasilta<sup>3</sup> or Poutanen<sup>4</sup> in view of Paice<sup>5</sup> or Wolf<sup>6</sup> and Campbell<sup>7</sup> (Ans. 3-6); and

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<sup>2</sup> Appeal Brief entered May 27, 2009.

<sup>3</sup> U.S. Patent No. 5,176,927 (filed July 10, 1991).

<sup>4</sup> K. Poutanen, *Enzymes: An important tool in improvement of the quality of cereal foods*, 8 TRENDS IN FOOD SCI. & TECHNOL. 300-306 (1997).

<sup>5</sup> Michael G. Paice et al., *A xylanase gene from Bacillus subtilis: nucleotide sequence and comparison with B. pumilus gene*, 144 ARCH. MICROBIOL. 201-206 (1986); *see also* Accession No. P18429, UniProt Database (1990) (sequence search result entered May 29, 2006).

(2) Claim 67, rejected under 35 U.S.C. § 103(a) as obvious over Haarasilta or Poutanen in view of Paice or Wolf and Campbell, further in view of Autio<sup>8</sup> (Ans. 6-7).

OBVIOUSNESS -- CLAIMS 56-66, 69, AND 70

ISSUE

The Examiner cites both Haarasilta and Poutanen as teaching that it is advantageous, for a number of reasons, to add xylanases to bakery doughs, but concedes that neither reference teaches adding a xylanase which is a polypeptide expressed from the nucleotide sequence of SEQ ID NO: 6, as required by claim 56 (*see* Ans. 3-5).

The Examiner finds, however, that both Paice and Wolf teach that a polypeptide expressed from the claimed nucleotide sequence has xylanase activity (*id.* at 5). The Examiner further finds that Campbell discloses that a polypeptide with the amino acid sequence of amino acids of 29-213 of SEQ ID NO: 5, as recited in Appellants' claims 59 and 63, has xylanase activity and is useful in bakery products (*id.*).

Based on these teachings, the Examiner concludes that an ordinary artisan would have considered it obvious to "use the xylanases of Paice et

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<sup>6</sup> Monika Wolf et al., *Genes encoding xylan and  $\beta$ -glucan hydrolysing enzymes in *Bacillus subtilis*: characterization, mapping and construction of strains deficient in lichenase, cellulase and xylanase*, 141 MICROBIOLOGY 281-290 (1995); *see also* Accession No.: 140569, PIR database (1996) (sequence search result entered May 19, 2006).

<sup>7</sup> U.S. Patent No. 5,405,769 (filed April 8, 1993).

<sup>8</sup> K. Autio et al., *Effects of Purified Endo- $\beta$ -xylanase and Endo- $\beta$ -glucanase on the Structural and Baking Characteristics of Rye Doughs*, 29 LEBENSM.-WISS. U.-TECHNOL. 18-27 (1996) (the Examiner inadvertently cited the journal as "Academic Press").

al., or Wolf et al., and Campbell et al., in baking, baking products and doughs as suggested by Haarasilta et al., or Poutanen” (*id.*).

Appellants argue that the Examiner failed to make a *prima facie* case of obviousness because the xylanase in the dough products of the appealed claims is bacterial, rather than fungal, and bacterial xylanases were known in the art to have the negative side effect of producing sticky doughs (App. Br. 9 (citing Spec. [0010]-[0012];<sup>9</sup> also citing Maat<sup>10</sup>)). Appellants note that neither Paice nor Wolf discloses using the claimed xylanase in bakery products, and further note that Campbell describes the xylanase claimed by Appellants as a modified xylanase used in the wood pulp manufacturing industry (*id.* at 10).

Moreover, Appellants urge, Campbell’s only mention of xylanases in a bakery dough context is a “vague” generic statement that cites the Maat article as support (*id.* at 11). However, Appellants argue, Maat teaches away from using bacterial xylanases in dough because such xylanases produce sticky dough (*id.*; *see also* Reply Br. 2-4). Appellants argue that an ordinary artisan would therefore not have been able to predict the “effects on dough stickiness of a bacterial xylanase which is expressed from the nucleotide sequence of SEQ ID NO:6. Indeed, one of skill in the art would have predicted that a bacterial xylanase would have a *negative* impact on dough stickiness based on the teaching of Maat, for example” (App. Br. 11-12).

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<sup>9</sup> In citing to their Specification, Appellants cite to the paragraphs of the published version of the instant application, Patent App. Pub. No. 2004/0234998 A1. We do the same for convenience and consistency.

<sup>10</sup> J. Maat et al., *Xylanases and their application in bakery*, in XYLANS AND XYLANASES 349-360 (J. Visser et al. eds., 1992).

Appellants also argue that, rather than presenting a finite number of predictable solutions to the problem of determining which xylanases should or could be used in bakery, a search of a relevant prior art protein database for “xylanase” yielded 494 sequences that were published between January 1, 1980 and January 1, 1999 (*id.* at 12). Thus, Appellants urge:

The Examiner has provided no motivation as to why one of skill in the art would have used the specifically claimed bacterial xylanase obtained by expressing the polynucleotide sequence of SEQ ID NO:6 or the xylanase having amino acids 29-213 of SEQ ID NO:5 over all other xylanases which were known in the art, specifically since it was known in the art that bacterial xylanases were known to produce very sticky doughs. Specification at ¶¶ [0010] - [0012] and Maat.

(*Id.* at 12-13; *see also id.* at 14.)

Appellants argue that when Poutanen is properly viewed in light of Maat, which is cited by Poutanen, the combined teachings of references would have taught an ordinary artisan away from using the claimed xylanase in bakery products (*id.* at 16-18). Appellants also argue that, despite being a bacterial xylanase, the claimed xylanase had the surprising and unexpected effect of producing dough that was less sticky than fungal xylanases, and also less sticky than dough treated with a bacterial xylanase that differs from the claimed xylanase by only a small number of amino acids (*id.* at 15 (citing Spec. Tables 1-4 ([0342]-[0349])).

Appellants do not argue any of the claims subject to this ground of rejection separately. We select claim 56 as representative of the rejected claims. *See* 37 C.F.R. § 41.37(c)(1)(vii).

In view of the positions advanced by Appellants and the Examiner, the issues with respect to this rejection are (a) whether a preponderance of

the evidence of record supports the Examiner's position that an ordinary artisan would have considered it *prima facie* obvious to include, in a bakery product or dough, a polypeptide expressed from the nucleotide sequence of SEQ ID NO: 6, and if so, (b) whether Appellants have advanced sufficient evidence of unexpected results to outweigh the Examiner's *prima facie* case.

*FINDINGS OF FACT ("FF")*

1. It is undisputed on this record that Paice discloses that a polypeptide expressed from the nucleotide sequence of SEQ ID NO: 6 has xylanase activity (*see also* Paice 201 (abstract) ("A gene coding for xylanase (endo-1,4- $\beta$ -D-xylan xylanohydase, EC 3.2.1.8) from *Bacillus subtilis* PAPI 15 has been isolated and its complete nucleotide sequence determined.")).
2. It is undisputed on this record that Wolf discloses that a polypeptide expressed from the nucleotide sequence of SEQ ID NO: 6 has xylanase activity (*see* Wolf 281 (abstract) ("The gene encoding extracellular xylanase (*xynA*) was amplified . . . from *Bacillus subtilis* 168 . . . . The sequence[] of *xynA* . . . [was] identical to . . . the xylanase . . . gene[] from *B. subtilis* PAPI 15.")).
3. It is undisputed on this record that Campbell discloses that a polypeptide expressed from the nucleotide sequence of SEQ ID NO: 6 has xylanase activity (*see* Campbell, abstract ("The thermostability of the . . . *Bacillus circulans* xylanase was increased by site-directed mutagenesis."); *see also, id.* at col. 6, ll. 63-66 ("The xylanase from *B. circulans* is functionally identical to that from *B. subtilis* . . . . These proteins differ only at one residue and are among the shortest xylanases . . . ."))).
4. Campbell notes that, in addition to being useful in the pre-treatment of kraft wood pulp, xylanases "have been reported to be useful in" a number of

other applications, including “altering texture in bakery products” (*id.* at col. 1, ll. 43-55 (citing Maat)).

5. Campbell discloses that “[s]everal of these application[s] could benefit from a thermostable xylanase, for example, food processing at elevated temperatures” (*id.* at col. 1, ll. 65-67).

6. Haarasilta discloses:

The present invention contemplates a method for improving the production process of dry cereal products and the quality of the baked product produced therefrom which comprises combining flour, yeast and water with an amount of an enzyme preparation comprising hemicellulose and/or cellulose degrading enzymes effective to reduce the amount of moisture necessary to form a suitable baking dough. The resulting dough requires shorter baking time and the need for post-baking drying in order to reduce the moisture content of the final product to an acceptable level is decreased or eliminated.

(Haarasilta, col. 4, ll. 30-42.)

7. Haarasilta discloses that a “suitable enzyme dosage level is, e.g., about 0 to about 50,000 Units, preferably about 10 to about 20,000 Units of hemicellulase (xylanase)” (*id.* at col. 5, ll. 40-42).

8. Poutanen discloses:

Improvements in bread volume have been reported to have been achieved with both  $\alpha$ -amylases and xylanolytic enzymes; moreover, the simultaneous use of  $\alpha$ -amylase and xylanase has been shown to have an additive effect. Enzymes serve as a tool to counterbalance reductions in bread volume due to unfavourable changes in the flour baking quality, or the use of non-wheat raw materials. The successful cloning of both  $\alpha$ -amylase and xylanase genes into baker's yeast has been reported, producing yeast strains that improve bread quality both by increasing volume and reducing staling.



(Poutanen 304 (citations removed).)

9. Table 3 of Poutanen is reproduced below:

Table 3. Recent reports of the effects of xylanolytic enzymes in bread baking	
Effect	Ref.
Hemicellulase mixture improved the handling properties of high-fibre wheat bread and increased loaf volume	Haseborg and Himmelstein (1988) <sup>27</sup>
A specific <i>Aspergillus awamori</i> endo-xylanase was effective in increasing the specific volume of wheat bread without causing stickiness	Maat et al. (1991) <sup>21</sup>
Isolated <i>Aspergillus awamori</i> xylanases differed in their capacity to improve the loaf volume of wheat bread owing to differing abilities to solubilize and degrade water-unextractable arabinoxylan	Gruppen et al. (1993) <sup>29</sup>
Pentosanase-containing enzyme preparation solubilized arabinoxylans, which were not further hydrolysed, and increased the viscosity of the dough extracts	Rouau (1993) <sup>25</sup>
Pentosanase-containing enzyme preparation produced improved and more uniform bread quality characteristics for 12 different wheat flours	Rouau et al. (1994) <sup>26</sup>
Pentosanase preparation increased the loaf volume of wheat bread enriched with insoluble pentosans	Krishnasau and Hosenev (1994) <sup>27</sup>
Rye cell walls were degraded, and the dough and bread microstructure altered by isolated <i>Trichoderma reesei</i> xylanase	Autio et al. (1996) <sup>28</sup>
Hemicellulase mixture was more effective than isolated <i>Trichoderma reesei</i> xylanase at improving the loaf volume of fibre-enriched wheat bread	Laurikainen et al. (in press) <sup>26</sup>

Table 3 lists a number of instances in which xylanases positively affected the qualities of bread or dough (*id.* at 304).

10. Appellants assert, and the Examiner does not dispute, that all of the xylanases mentioned in Poutanen's Table 3 are fungal enzymes (App. Br. 9).

11. Maat discloses a “particular  $\beta$ -(1,4)-xylanase produced by an Aspergillus niger var. awamori strain as being very effective in increasing the specific volume of breads, without giving rise to a negative side effect on dough handling (stickiness of the dough) as can be observed with xylanases derived from other fungal or bacterial sources” (Maat 349).

12. In the “Background Art” section, Appellants’ Specification states that “[i]t has been considered for some time now that bacterial xylanases would produce very sticky dough. Hence, one would normally expect the xylanases of *Bacillus subtilis*--such as that of U.S. Pat. No. 5,306,633--to produce a very sticky dough” (Spec. [0010]).

13. The “Background Art” section of Appellants’ Specification also states:

Prior art enzymes which caused stickiness had to be used in carefully controlled amounts so that stickiness would not adversely affect handling to such a degree that effective commercial handling was hampered. However, the need to carefully control dosage prohibited the addition of xylanase directly to flour prior to production of the dough. It was therefore necessary with prior art systems to add the xylanase in a very controlled manner during the production of the dough.

(*Id.* at [0011].)

14. The “Background Art” section of Appellants’ Specification further States:

To date, fungal xylanases have been typically used in baking. For example, J Maat et al. (Xylans and Xylanases, edited by J Visser et al, 349-360, Xylanases and their application in bakery) teach a .beta.-1,4-xylanase produced by an *Aspergillus Niger* var. awarmori strain. According to these authors, the fungal xylanase is effective in increasing the specific volume of breads, without giving rise to a negative side

effect on dough handling (stickiness of the dough) as can be observed with xylanases derived from other fungal or from bacterial sources.

(*Id.* at [0012].)

15. Appellants' Specification explains that, in view of this prior art, a "known problem in the art is how to prepare baked goods from a dough which does not have adverse handling properties. A more particular problem is how to provide a dough which is non-sticky--i.e. a dough that is not so sticky that it causes handling and processing problems" (*id.* at [0015]). However, the "present invention seeks to provide a solution to these problems" (*id.* at [0016]).

16. Appellants' Example 1 is entitled "Dough Stickiness as a Function of Different Xylanases, Doses and Resting Time" (*id.* at [0324]).

17. Example 1 compared the stickiness of dough including four different xylanases:

"X1" [which] corresponds to a purified sample of endo- $\beta$ -1,4-xylanase from *Aspergillus niger*. This xylanase has an activity of 8400 TXU (15000 TXU/mg).

"Novo" [which] corresponds to Novo Nordisk's Pentopan Mono BG from *Thermomyces*. This xylanase has an activity of 350.000 TXU (56000 TXU/mg).

"BX" [which] corresponds to a purified sample of the [Appellants'] new bacterial xylanase. This sample has an activity of 2000 TXU (25000 TXU/mg).

"Röhm" [which] corresponds to Röhm GmbH's bacterial xylanase, Veron Speciel. This sample has an activity of 10500 TXU (25000 TXU/mg).

(*Id.* at [0328]-[0331].)

18. In the first comparison in Example 1, Appellants found that "the fungal xylanase X1 and the xylanase in the Novo product give rise to dough

stickiness. [Appellants’] new bacterial xylanase does not give rise to the same stickiness. In addition, the stickiness seems to decrease compared with control” (*id.* at [0346]; *see also id.* at [0344] (Table 2); *see also* Fig. 1).

19. In the second comparison in Example 1, Appellants found that the “results show that BX (the new bacterial xylanase) gives rise to much less stickiness than the fungal xylanase tested. Moreover, it is found that the new xylanase gives rise to much less dough stickiness than the Röhm bacterial xylanase” (*id.* at [0351]; *see also id.* at [0349] (Table 4); *see also* Fig. 2).

#### *PRINCIPLES OF LAW*

In *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), the Supreme Court reaffirmed that “when a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *Id.* at 417 (quoting *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273 (1976)).

The Court reasoned that:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

*Id.* at 421.

In this regard, the Federal Circuit has noted that “[o]bviousness does not require absolute predictability of success . . . . For obviousness under

§ 103, all that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988).

[T]o have a reasonable expectation of success, one must be motivated to do more than merely to “vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful.” Similarly, prior art fails to provide the requisite “reasonable expectation” of success where it teaches merely to pursue a “general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it.”

*Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (quoting *O’Farrell*, 853 F.2d at 903-04).

Regarding unexpected results, “[m]ere improvement in properties does not always suffice to show unexpected results. . . . [W]hen an applicant demonstrates *substantially* improved results . . . and *states* that the results were *unexpected*, this should suffice to establish unexpected results *in the absence of* evidence to the contrary.” *In re Soni*, 54 F.3d 746, 751 (Fed. Cir. 1995).

#### ANALYSIS

A preponderance of the evidence supports the Examiner’s position that the bakery product or dough recited in claim 56 would have been obvious to an ordinary artisan. Claim 56 recites a bakery product or dough that contains a polypeptide expressed from the nucleotide sequence of SEQ ID NO: 6.

It is undisputed that a polypeptide expressed from SEQ ID NO: 6 was known to have xylanase activity (FF 1, 2). Moreover, Campbell discloses

that a xylanase which undisputedly meets the requirements of claim 56 has thermostable properties which make the xylanase beneficial “for example, [in] food processing at elevated temperatures” (Campbell, col. 1, ll. 66-67 (FF 5)).

Further, xylanases were well known in the art to impart desirable properties to doughs and bakery products (FF 4, 6-11). Thus, in view of the prior art cited by the Examiner, an ordinary artisan would have been advised that a polypeptide expressed from SEQ ID NO: 6 not only possessed the xylanase activity known to be advantageous in bakery products, but was thermostable and therefore beneficial in methods involving food processing at elevated temperatures. Given these teachings, we agree with the Examiner that the ordinary artisan would have been prompted to include a polypeptide expressed by SEQ ID NO: 6 in a bakery product or dough, as required by claim 56.

We note, as Appellants urge, that certain xylanases, bacterial xylanases among them, were known to produce sticky dough (FF 11, 12). However, given the numerous teachings of the advantageousness of adding xylanases to bakery doughs (FF 4, 6-11), we are not persuaded that an ordinary artisan would have been dissuaded from including a xylanase expressed from SEQ ID NO: 6 in bakery products, particularly in view of that xylanase’s beneficial thermostability (FF 5).

Rather, it would have been equally reasonable for an ordinary artisan to arrive at a conclusion opposite than that advanced by Appellants; that is, one could conclude that Campbell, having cited Maat, was aware of the stickiness issue with certain xylanases, yet felt that the thermostability of the enzyme expressed from SEQ ID NO: 6 nonetheless outweighed such

concerns when using the enzyme to aid in food processing at elevated temperatures, such as occurs, for example, in baking (FF 5).

In this regard, as Appellants concede, dough stickiness was not known to make a particular xylanase totally unsuitable for use in bakery products; instead, stickiness-generating xylanases simply required more controlled addition techniques (FF 13). Thus, while an ordinary artisan might have viewed bacterial xylanases as a less suitable alternative, stickiness-generating xylanases were nonetheless known to be useful when the proper techniques were used. *See Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (“[I]n a section 103 inquiry, ‘the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.’”) (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976)).

It may be true, as Appellants urge (App. Br. 12), that the claimed xylanase is but one of several hundred possible xylanases that might have been added to dough. However, Campbell explicitly states that the claimed xylanase is thermostable (FF 3), a property that makes it beneficial in methods of processing foods at elevated temperatures (FF 5), which is of course exactly what baking involves. Thus, given the prior art cited by the Examiner, we are not persuaded that selecting the claimed xylanase for use in a bakery dough would have amounted to an ordinary artisan attempting to find the proverbial needle in a haystack.

We are therefore not persuaded that the Examiner failed to make a prima facie case of obviousness with respect to claim 56. Nor are we persuaded that Appellants have advanced sufficient evidence of unexpected results to outweigh the evidence of prima facie obviousness.

As noted above, “[m]ere improvement in properties does not always suffice to show unexpected results. . . . [W]hen an applicant demonstrates *substantially* improved results . . . and *states* that the results were *unexpected*, this should suffice to establish unexpected results *in the absence of evidence to the contrary.*” *In re Soni*, 54 F.3d at 751.

We note the disclosure in Appellants’ Example 1 that a xylanase according to claim 56 did not “give rise to the same [dough] stickiness” as two fungal xylanases to which the claimed xylanase was compared (FF 17-18). However, Appellants point to no assertion in the Specification that this was a surprising or unexpected result, or a substantial improvement.

The Specification also discloses that a xylanase according to claim 56 was found to “give[] rise to much less dough stickiness than” another bacterial xylanase (FF 19). Again, however, Appellants point to no assertion in the Specification that suggesting that this was a result that an ordinary artisan would have considered unexpected.

To the contrary, the only unambiguous assertions of unexpected results appear in Appellants’ arguments (*see* App. Br. 14-15). However, it is well settled that argument by counsel cannot take the place of evidence. *In re Cole*, 326 F.2d 769, 773, (CCPA 1964); *In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997). Moreover, neither Appellants’ arguments nor the Specification provide any clear explanation, based on the actual data generated in the experiments, as to why an ordinary artisan would have viewed the results obtained using the claimed xylanase as unexpected.

In sum, a preponderance of the evidence supports the Examiner’s *prima facie* case of obviousness with respect to claim 56. For the reasons discussed, we are not persuaded that Appellants have advanced sufficient



evidence of unexpected results to overcome the Examiner's prima facie case. Accordingly, we affirm the Examiner's obviousness rejection of claim 56, as well as claims, 57-66, 69, and 70, which were not argued separately.

OBVIOUSNESS -- CLAIM 67

*ISSUE*

The Examiner also rejected claim 67 under 35 U.S.C. § 103(a) as obvious over Haarasilta or Poutanen in view of Paice or Wolf and Campbell, further in view of Autio (Ans. 6-7). Claim 67 depends from independent claim 60 through claim 65. Those claims read as follows:

60. A dough for making a bakery product prepared by incorporating a bacterial xylanase comprising a polypeptide expressed from the nucleotide sequence of SEQ ID NO:6, whereby the resultant dough is less sticky than an otherwise identical dough prepared by incorporating a fungal xylanase instead of said bacterial xylanase.

65. The dough of claim 60, comprising wheat flour, water and a bacterial xylanase expressed from the nucleotide sequence of SEQ ID NO:6.

67. The dough of claim 65, wherein said bacterial xylanase is free of detrimental levels of glucanase enzymes.

The Examiner relied on Haarasilta, Poutanen, Paice, Wolf, and Campbell for the teachings discussed above, but conceded that those references did not "explicitly teach xylanase free of glucanase enzymes" (*id.* at 6). The Examiner found, however, that Autio taught that glucanases had an undesirable hardening effect on doughs and bakery products, and concluded that an ordinary artisan would therefore have considered it obvious to exclude glucanases from doughs (*id.* at 6-7).

Appellants argue that, “[f]or the reasons discussed above, Autio does not cure the deficiencies of Haarasilta[,], Poutanen, Paice, Wolf and Campbell. Additionally, Autio relates to the use of a purified fungal (*Trichoderma reesei*) xylanase in rye doughs and the effects thereof” (App. Br. 19 (citing Autio 19 (Materials & Methods))).

Appellants also argue that Autio does not disclose using “a bacterial xylanase in dough, let alone a bacterial xylanase expressed from the nucleotide sequence of SEQ ID NO:6” (*id.*). Moreover, Appellants argue, “Autio does not teach or suggest that the use of such a bacterial enzyme will give rise to a less sticky dough compared with an otherwise identical dough prepared by incorporating a fungal xylanase instead of a bacterial xylanase” (*id.*).

The issue with respect to this rejection, then, is whether a preponderance of the evidence supports the Examiner’s position that an ordinary artisan would have considered claim 67 obvious in view of the cited references.

#### *FINDINGS OF FACT*

20. Autio discloses that the “importance of arabinoxylans and  $\beta$ -glucans in rye baking was studied by depolymerizing these cell wall polysaccharides in situ with purified xylanase and  $\beta$ -glucanase” (Autio 18 (abstract) (*italics removed*)).

21. In baking tests, Autio found that “[w]hen xylanase was added, there was a slight tendency towards softer bread crumb and reduced staling rate, especially when the xylanase level was 100 nkat/g flour . . . .  $\beta$ -Glucanase addition had a hardening effect, especially on the bread baked from the Muskate flour” (*id.* at 21).

*ANALYSIS*

A preponderance of the evidence supports the Examiner's obviousness conclusion regarding claim 67. As discussed above, we agree with the Examiner that an ordinary artisan would have considered it obvious, in view of Haarasilta or Poutanen, taken with Paice or Wolf, and Campbell, to add a bacterial xylanase expressed from SEQ ID NO: 6 to dough.

Given Autio's teaching, which Appellants do not dispute, that glucanases were detrimental to bread doughs (FF 20-21), we agree with the Examiner that an ordinary artisan would have been prompted to exclude glucanases from doughs, as recited in claim 67. The fact that Autio did not test the claimed bacterial xylanase expressed from SEQ ID NO: 6 does not demonstrate unobviousness, given that the claimed polypeptide was a known xylanase (FF 1, 2), and was known to be thermostable -- a property suggesting that it would have been beneficial in food processing methods using elevated temperatures (FF 3-5).

Thus, the fact that Appellants added the claimed xylanase to dough for a different reason than that suggested by the prior art -- stickiness reduction rather than thermostability -- does not demonstrate that claim 67 would have been unobvious. *See KSR*, 550 U.S. at 419 ("In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103."); *see also In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) ("Mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention."). In this regard we note that, for the reasons discussed above, Appellants have not

established that the level of stickiness resulting from the claimed xylanase would have been unexpected.

Accordingly, as a preponderance of the evidence supports the Examiner's conclusion of obviousness with respect to claim 67, we affirm the Examiner's rejection.

#### SUMMARY

We affirm the Examiner's rejection of claims 56-66, 69, and 70 as obvious over Haarasilta or Poutanen in view of Paice or Wolf and Campbell.

We also affirm the Examiner's obviousness rejection of claim 67 over Haarasilta or Poutanen in view of Paice or Wolf and Campbell, further in view of Autio.

#### TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

#### AFFIRMED

cdc

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